

Congress, individual states, insurance companies and business funding also helped recovery. With sophisticated warning systems in place and the ready availability of emergency funds, the impact of tropical storms in a wealthy HIC like the USA will almost always be far less destructive than in poorer LICs.



Figure 3.19: The evacuation of almost 4 million people under way

Why were most people evacuated by road rather than by air or sea?

3.5 Reasons for living in high-risk areas

History tells us where in the world specific types of natural hazard are likely to occur. We have a fairly good idea of where the high-risk areas are. Figures 3.4 (page 67) and 3.9 (page 71) show the global distributions of two natural hazards (earthquakes and tropical storms) that cause the greatest number of deaths and the largest amount of damage. Compare those maps with the map showing the global distribution of major cities and therefore areas with high population densities (Figure 3.20). What we find may be quite surprising. Many of those cities and areas of high population density are located within the risk areas of earthquakes and tropical storms. Why do so many people continue to live and work in what are clearly hazardous areas?

There are a number of possible explanations.

- A lack of education and information may mean that residents are unaware of the real risks, particularly if the hazards occur only infrequently. This can be the case particularly in poor undeveloped areas
- People may be aware of the risks but decide to live in the area anyway. Perhaps the area offers some tempting benefits (see below)
- It may be that people are unable to move away from hazardous areas, owing to a lack of money or they are concerned about not being able to find a job elsewhere

It has been estimated that between 2000 and 2010 close to 1 million people were killed by earthquakes. This is not surprising because there are billions of people living in the world's earthquake zones.

Compare Figure 3.4 (page 67) with Figure 3.20 (page 80).



Figure 3.20: Global distribution of major cities

- Human nature is such that many people are optimists and think that they will never be a natural disaster victim. Alternatively they may be resigned to their fate – if they are to be victims, there is nothing they can do about it
- Perhaps the biggest factor is that the areas of high population density have gradually grown up over many centuries. As a result, they have a sort of momentum which keeps them going no matter how many hazards occur. So for millions of people, these high-risk areas are home and as a result have a number of attractions. For example, this is where their family has lived for generations. This is where many of their relatives and friends are living today. This is where they work. This is where, despite the hazards, they feel comfortable
- The cities in these high-risk areas represent centuries of investment – of money and human effort. No human society is rich enough that it can afford to throw away all this investment and abandon these cities.

Unlike earthquakes and tropical storms which are probably the most vicious and costly natural hazards, volcanoes do offer some benefits:

- **minerals** – volcanoes bring valuable mineral resources to the surface. These include diamonds, gold and copper
- **fertile soils** – volcanic ash often contains minerals that enrich the soil. Fine dust is quickly mixed into the soil like an artificial fertiliser
- **geothermal energy** – water running through the Earth's crust is heated by volcanic rock at or near a plate margin. This hot water emerges as hot springs and can be used to heat homes, factories and business premises

It is wrong to think that all volcanoes give rise to fertile soils.



Figure 3.21: Mount Vesuvius crater: a tourist attraction

- **tourism** – volcanoes are features that interest many people and do attract tourists. Mount Vesuvius in Sicily (Italy) is a classic example, drawing hundreds of thousands of tourists each year (Figure 3.21). The hot springs found in volcanic areas around the world also attract visitors.

Finally, you should note that dense populations are also found in the high-risk areas of other natural hazards. Obvious examples are those river valleys and delta areas that suffer from regular and severe flooding. For example, the Ganges, Brahmaputra and Meghna delta where some 90 million people live (see Part 1.8). Here, as with volcanoes, there are some benefits, such as fertile soils replenished by the regular flooding.

3.6 Mitigating the consequences of hazards

Mitigation (or **adjustment**) involves taking actions before, during and after a hazard event to reduce its possible consequences. It is all about learning to live with hazards and trying to minimise their potential impacts. At least six major steps or actions are involved here (Figure 3.22):

- **Risk assessment** – determining the probability of a particular hazard happening and the scale of its possible damage
- **Prediction** – putting in place monitoring systems that might give warning about an imminent hazard
- **Preparation (adjustment)** – finding ways of reducing the possible death toll and the scale of damage of property. Educating people about the hazards of the areas in which they live and what to do in case of an emergency is important here
- **Hazard event** – the natural hazard that has been anticipated and planned for happens
- **Recovery** – first emergency aid and then repairing the damage

Why do you think tourists like to visit volcanoes?

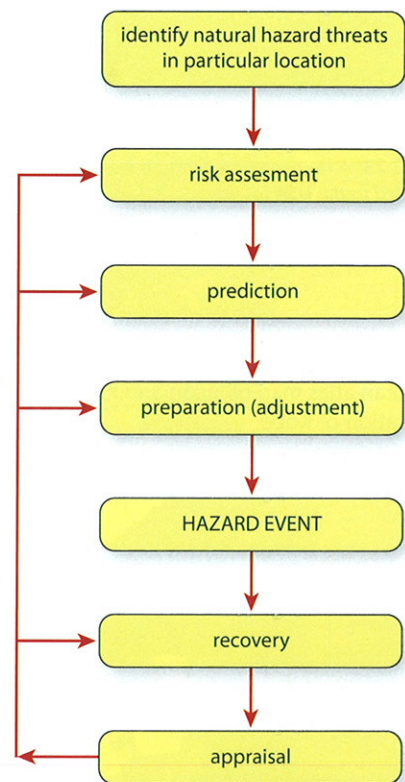


Figure 3.22: Steps for managing natural hazards